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MEMO

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To: Chuck Duerschner
From: Curtis Christiansen
Through: Terry Johnson
Date: January 12, 2017
Re: South Sioux City Force Main

On January 10, 2017, I met with Terry Johnson and EPA Region 7 to conduct an inspection of the Big Ox facility and CHS industries.

Before inspecting the industries we met with South Sioux City Manager, Lance Hedquist and city superintendent, Bob Livermore, and Pete Green and Lance Tipton, EPA compliance inspectors. The meeting began with a conference call with John Smith with EPA Region 7 who went over the reasons for the EPA inspection at Big Ox and other potential industries. He also informed City personnel that the Agency had sent up a GMAP mobile unit capable of taking instantaneous air pollution data to investigate large areas. The unit is capable of sampling for several different ambient air pollutants at the same time to assist in pinpointing their sources. The unit would be driving around the South Sioux City area during the time that the other inspections would be occurring.

The City has discontinued adding Bioxide® at the BPI sewer connection since Big Ox is adding FeCl at their facility. The City is still adding peroxide in some areas. 24 homes were initially impacted by the odor problems. Residents of 10 to 11 homes are still displaced. 8 homes have been cleaned by servicemaster, and 7 are currently in cleanup. It seems in every case of odor problems in the homes, it has been associated with improper plumbing installation or plumbing problems within in the residence.

All industries will again be discharging to Big Ox. Big Ox will have pretreatment limits implemented by the city of Sioux City, IA. The pretreatment permits for industries discharging will not be renewed by the city of Sioux City and will expire in April 2017. To replace the expiring pretreatment permits, South Sioux City is working on Sewer Use Agreements and Sewer Use Fees for each of the industries discharging to Big Ox, as well as a Sewer Use Fee for Big Ox.

Big Ox started up receiving wastewater from other industries again on Wednesday, January 4th. Since startup ambient air quality has improved. There may be odors emitted at Big Ox, that originate within the building. Carbon units for vents has been ordered and will arrive on the 16th.

EPA asked about SSOs. City indicated there was one SSO in December, which was inspected by NDEQ, (at my inspection on December 21st) EPA asked when lift stations were constructed. Roth LS and Bennett LS were constructed in 2007 timeframe.

The city has a daily conference call at 1000 with the design engineer, McClure Engineering, Big Ox, and Sioux City. Big Ox was not available for the conference call.

We were included in the conference call and the following was discussed:
1. The temporary lift station continues to have problems related to the extreme cold weather conditions. Lack of flow caused the valves in the pump to freeze up. The city installed some heat blankets. Engineer is considering installation of commercial heat tape. If necessary a temporary pole barn may be constructed around the pumps.
2. The city and engineer are working on design of Phase II of the force main project. Phase II will complete the force main from Big Ox to the temporary lift station. Construction will start as soon as plans are approved, sometime in March is projected. They are currently working on the easements for the force main. The city has requested Big Ox to provide a constant flow. Big Ox is trying to comply with city's request for constant flow.
3. They currently have wastewater sampling through January 9th. Sioux City reported the samples collected from Big Ox on Friday the 6th were very dark color, Samples collected on Monday the 9th were better and more of a brown color. Color was related to operation of the GEM DAF unit. Operation of the GEM unit is improving as Big Ox starts up the facility. Ambient H2S in sewer at Dakota Street was lower. At Bennett lift station a 30 to 40 ppm measurement was recorded. There was one spike of 300 ppm reported.
4. Omaha World Herald has scheduled an interview with the city for 1330 today. Big Ox will be in attendance at interview as well.
5. Sulfide testing at homes was discussed. One home would like to have drywall tested. City not sure if there is a method to test drywall. EPA provided the name of Spencer Williams as someone to call regarding the testing of drywall.
6. City still receiving complaints from the citizens about odor from the Big Ox facility. May be related to the off loading and trucking of wastewater at the Big Ox facility.

Following the meeting with South Sioux City, we met with Big Ox. The meeting was conducted with Kevin Bradley, Rob Easley, Jason Osbahr, and Perry Winkler. Kevin and Rob were from the corporate office in Green Bay, Jason is the process engineer and is from Iowa, and Perry Winkler is the South Sioux City plant manager. Influent flow to Bio Ox can come from multiple sources. Waste can be trucked in and dumped into one of two receiving pits. Canned goods can be received, the cans opened and dumped into one of the two receiving pits. The receiving pits are discharged to a mix tank and can be pH adjusted at the mix tanks. Following the mix tank the wastewater can be discharged to Anaerobic Digester 1, followed by Anaerobic Digester 2. From Anaerobic Digester 2, the wastewater is treated by a centrifuge to pull out solids. Solids are shipped to land application sites or landfill sites. The centrifuges generate 30 to 40 wet tons of solids per day at a moisture content around 50% - 60%. Centrate from the centrifuge goes to the wet well of the lift station.

Industrial and residential wastewater is received from two force mains. Force main 1 receives wastewater from CHS and residential wastewater. BPI and Richardson Milling is received through Force Main 2. The force mains discharge into a 300,000 gallon DAF feed tank. From DAF feed tank wastewater is treated by a screen followed by the GEM DAF unit. Float removed in GEM unit is sent to the digesters, the rest of the industrial wastewater flows to the wet well and is pumped to the city collection system.

Big Ox explained the incident that caused the H2S problems in the residences occurred when they received a pH from their industrial influent below 2.0 pH. The low pH caused their digester to go from a pH of 8.8 down to pH of 3.9 in a very short time. The city told the industry to stop discharging. The very low pH caused soluble H2S to volatilize and caused the sever H2S problem.

All waste trucked to Big Ox is precertified. Industries that have not been precertified are not allowed to dump. The pH of every load is pH balanced. The lowest acceptable pH is 5.5. The digester is operated at a pH of 6.5 at the influent end. As wastewater moves through the digester it rises to pH of around 7.8. The discharge to the city usually has a pH of 7.3. The digester generates approximately 40,000 gallons of sludge for each 1.4 mgd of influent received. The solids are generally around 10 % and the centrifuge increases solids content to around 20%.

Phase I of force main was funded by Big Ox. They are involved in the planning of Phase II, completion of the force main from Big Ox to the temporary lift station, but the city will be the funding source. Big Ox will also pursue a Phase III, which will tie the Big Ox force main directly to the force main under the Missouri River at the Bennett Lift Station. Big Ox has also installed a deck over the wet well of the Bennett lift station and installed carbon filters on the vent piping. This has removed odors originating from the wet well that I observed during the December 21st inspection.

Sioux City currently controls the industries through the Pretreatment permitting program. However control will be transferred to South Sioux City. The industries, Big Ox, and the city of South Sioux City are working on an agreement between all parties.

Following our initial pre-inspection meeting, we were provided a tour of the Big Ox facility. The treatment units and processes was discussed primarily with Jason Osbahr, who is the process engineer and appears to the person having the best understanding of the anaerobic treatment process.

EPA had intended to sample the Big Ox effluent. However, the sampling location would require removing the cover over the wet well and could expose workers to unsafe levels of H2S. Grab samples collected from the GEM DAF unit were very dark and Big Ox did not believe they would be representative. EPA decided to split samples collected by Sioux City WWTF.

On January 11, 2017, I met with Terry Johnson, and EPA to inspect the CHS facility. We met with Chris Oehler, plant manager, Scott Duncan EHS coordinator, and Jeremy MacClure Pant Engineer.

CHS employs approximately 74 people and runs 4 shifts 24/7. The facility was built in 2008 and CHS is the 3rd owner. They receive white flake, which is a coarsely ground flour from soybeans. Mechanical equipment and enzymes are used to separate out the soy protein. Product is shipped out in bags and totes. Wastewater streams include the decanters, clarifiers, cooling tower, boiler blowdown, and CIP. There pretreatment permit requires pH of wastewater discharge to collection system to be between a pH of 5.5 and 11.0.

The wastewater discharge is sampled daily for TSS and continuously monitored for pH. Hydrochloric Acid (HCL) and Sodium Hydroxide (NaOH) are used to control the pH. The set point for addition of sodium hydroxide is at a pH of 5.5 and NaOH is added until pH reaches 6,0. If pH reaches 9.7, HCL is added until the pH is lowered to 9.2. Sioux City, IA also samples and charges for TSS and BOD.

Wastewater flow is approximately 15,000 to 18,000 gallons per hour. The pH adjustment tank is 30,000 gallons and they have about 1 to 11/2 hour of detention time in the tank.

They are in production year round, but have scheduled outages each year. Every 4 days they conduct a 20 hour CIP cleaning.

Domestic wastewater is discharged separately from the industrial wastewater, but the domestic and industrial wastewater is combined in the collection system. Both industrial and domestic wastewater flows by gravity to the Roth lift station where it is either pumped to Big Ox or the South Sioux City collection system.

CHS does not have a well for their water source. Water is supplied by the city and is softened and treated in a R/O unit. Refrigeration is through an ammonia unit.

A fiberous by-product is produced and is trucked out and used as cattle feed.

The pretreatment permit with Sioux City, IA will expire in April. Last September billing was transferred from Sioux City to South Sioux City. CHS also has a contract with Big Ox. The city of South Sioux City says the contact is now null and void. The city may be charging more than the contract with Big Ox, so CHS is not sure they consider the contract null and void.

CHS is aware of an agreement being prepared by the city of South Sioux City but there seems to be little discussion between the city and CHS, according to CHS.

Later in the day, Terry Johnson accompanied the EPA inspectors on an industrial stormwater inspection of the Big Ox facility. Big Ox has yet to fulfill their fourth quarter benchmark sampling. They have conducted visual inspections of stormwater runoff.

During the inspection a small spill was noticed on the north side of the facility where trucks travel to deliver waste products. The unidentified spill was frozen along the side of the concrete driveway. Mr. Osbahr directed an employee to have the spilled material cleaned up.

Comments and Recommendations

1. The person responsible for operation of the treatment processes at the Big Ox facility was not identified at our meeting. The process engineer that conducted the tour and explained the process and equipment was Jason Osbahr, who is located in Des Moines.

2. The city of South Sioux City appears to be preparing an Sewer Use agreement or ordinance with the industries. The city and Big Ox indicated there was good communication and cooperation between the city and all industries. CHS did not indicate the communication was as complete as indicated by the city.

This is a critical document for the operation of the sewer system. Not only will it determine the sewer use charges, but it will need to determine such items as::

a. the quality of the industrial wastewater that Big Ox will accept
b. what authority Big Ox will have in refusing to treat an industrial flow
c. how slug loads from industrial facilities will be handled
d. who and what notification is needed when industries wastewater is not within the acceptable levels.

3. There were several locations within the collection system that were rerouted to the Big Ox facility. Further investigation is needed to understand whether these connections were permanently removed from the existing collection system or only temporarily blocked.

4. The intent of the city and Big Ox is to route all industrial wastewater to the Big Ox facility and all industrial wastewater to be pumped by Big Ox to the Sioux City, IA wastewater treatment system. This means that Big Ox is essentially a city lift station, and during the departments Phase II review, it will need to be reviewed for back up power and full capability of operation at all times, as would be required of a municipal lift station.

5. During the recent shut down of Big Ox, industrial wastewater was returned to the existing system. Further investigation by the department is needed to determine where wastewater will flow in the event of another Big Ox shutdown, or in the event Big Ox would refuse to accept an industries wastewater.